

Non-Powered Spectrophotometry for Lighting

Completed Technology Project (2012 - 2012)



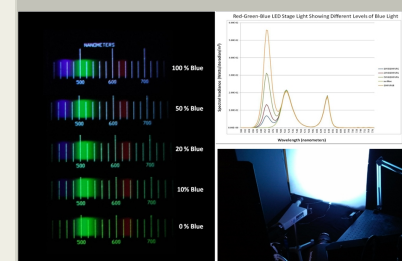
Project Introduction

This process improvement innovation would like to suggest a non-powered method and tool set that can be developed to assist crewmembers and ground support teams with spectral evaluations of on-board lighting systems. These type of measurements are typically taken with spectrophotometers which require power, calibration, and would be difficult to flight certify. The spectral characteristics of a light source are an important component to the design and maintenance of a lighting environment where habitability and workmanship issues are tied to color, such as litmus strip testing and crew health issues with Circadian Rhythm. Additionally, a non-powered toolset may be very useful for development of pass/fail evaluation tools and requirements regarding lighting color. The test method and product will be developed using standard off the shelf optical components and be integrated with a card set that has calibrated markings to interpret spectra observed with the optical components.

The spectrum of a light affects crew health. This solution does not require power or a calibration cycle. The premise is that an optical solution is sufficient to document spectra for light sources such as those on ISS. This innovation would like to research the viability of spectral characterization of a light source without the use of photometric devices like spectrophotometers. The spectral characteristics of a light source are an important component to the design and maintenance of a lighting environment where habitability and workmanship issues are tied to color. Color is important for tasks like litmus strip color matching, and crew health issues in controlling Circadian Rhythm. Currently, the International Space Station does not have on-board sensors to measure the spectrum of the lighting environment. Assuming a successful completion of this study, additional proposals will be made for formal development of a test kit to be used for ground support and on-orbit color characterization of lighting environments.

Anticipated Benefits

The ISS Program will be installing multi-spectrum solid state luminaires on ISS in 2016. These luminaires can affect crew sleep patterns and will provide researchers ways to optimize their use. The spectroscopy technology is an inexpensive, power free means to monitor the spectrum output.



Project Image Non-Powered Spectrophotometry for Lighting

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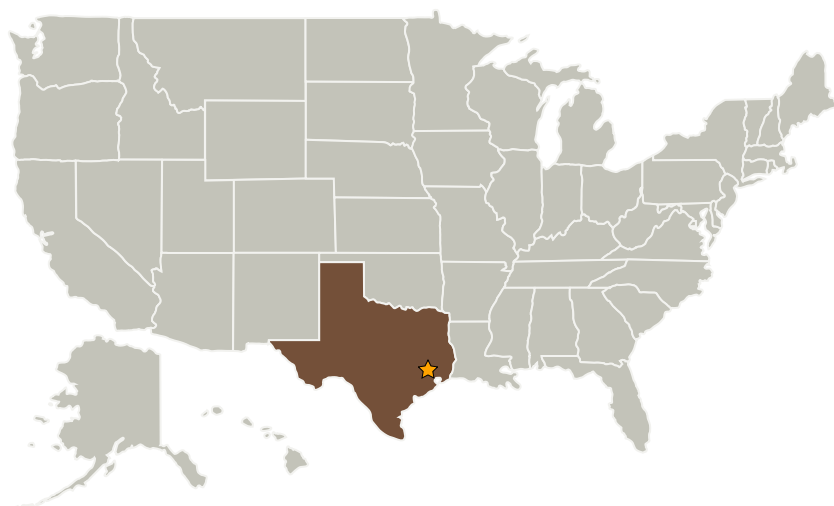
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Lockheed Martin Space Systems(LMSS)	Supporting Organization	Industry	Sunnyvale, California

Primary U.S. Work Locations

Texas

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Center Innovation Fund: JSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Carlos H Westhelle

Project Manager:

Toni A Clark

Principal Investigator:

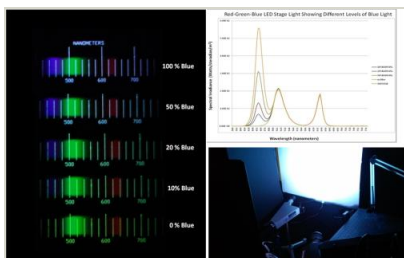
Toni A Clark

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Images

**12411-1378762000047.jpg**

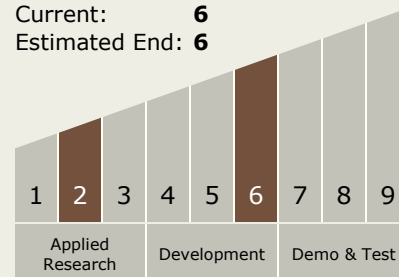
Project Image Non-Powered
Spectrophotometry for Lighting
(<https://techport.nasa.gov/image/2296>)

Links

NTR 1
(no url provided)

Technology Maturity (TRL)

Start: **2**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.3 Human Health and Performance
 - └ TX06.3.3 Behavioral Health and Performance